

REMARKS/ARGUMENTS

In view of the following remarks, the applicants respectfully submit that the pending claims are not rendered obvious under 35 U.S.C. § 103. Accordingly, it is believed that this application is in condition for allowance. If, however, the Examiner believes that there are any unresolved issues, or believes that some or all of the claims are not in condition for allowance, the applicants respectfully request that the Examiner contact the undersigned to schedule a telephone Examiner Interview before any further actions on the merits.

The applicants will now address each of the issues raised in the outstanding Office Action.

Rejections under 35 U.S.C. § 103

Claims 1, 2 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2000026112 ("the Yoshida publication") in view of U.S. Patent No. 5,781,236 ("the Shinbori patent"). The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

First, since claims 2 and 13 are cancelled, this rejection is moot with respect to these claims.

Second, independent claim 1 is not rendered obvious by the Yoshida publication in view of the Shinbori patent

because these references, either taken alone or in combination, neither teach, nor make obvious, a photographing device provided with a dust removing mechanism comprising a photoelectric conversion element which converts an optical image into an electric signal; an optical element arranged in a light path of the photoelectric conversion element; a piezoelectric element provided at a peripheral portion of the optical element; a drive circuit which supplies a drive signal to the piezoelectric element to drive the piezoelectric element; and **a control circuit which causes the piezoelectric element to vibrate via the drive circuit, to thereby cause flexural standing wave vibration in the optical element, the control circuit being configured to cause at least two flexural standing wave vibrations in the optical element at different nodes of vibration by changing control modes with time.**

Embodiments consistent with the present invention include a dust removing mechanism that drives a **piezoelectric element to vibrate, causing a flexural standing wave vibration in an optical element. The control circuit causes at least two flexural standing wave vibrations at different nodes of vibration by changing control modes with time** in order to remove dust adhering to the optical element efficiently. (See, for example, Figures 6-11.)

On the other hand, the Yoshida publication concerns a driving apparatus that moves a lens along an optical axis, in projecting and retracting directions, using an impact-type piezoelectric actuator. Specifically, a drive

circuit continuously outputs a drive voltage having a rectangular waveform. The drive voltage is applied to an impact-type piezoelectric actuator causing it to expand or contract, thereby linearly moving (not vibrating) a lens along an optical axis. (See e.g., abstract, Figs. 1-3 and paragraphs [0046]-[0049] of the Yoshida publication.) The drive voltage causes the piezoelectric element to be displaced in sawtooth configuration waveform. (See, for example, paragraphs [0043], [0049] and [0050] of the Yoshida publication.) The displacement of the piezoelectric element in sawtooth configuration waveform does not cause a **flexural standing wave vibration in the lens** (which is cited as teaching the claimed "optical element"). Thus, the Yoshida publication does not teach a control circuit which causes the piezoelectric element to vibrate, thereby **causing a flexural standing wave vibration in the optical element** as recited in claim 1, as amended.

Further, the Yoshida publication does not teach or suggest **the control circuit causes at least two flexural standing wave vibrations in the optical element at different nodes of vibration by changing control modes with time.**

Furthermore, the Yoshida publication discusses that the value of the **drive frequency** f_d of the drive voltage output could be in a range of $0.3 \times f_r < f_d < 1.5 \times f_r$, where f_r is the resonance frequency. The Yoshida publication does not teach that the **resonance frequency** is varied.

The purported teachings of the Shinbori patent do not compensate for the deficiencies of Yoshida publication with respect to claim 1 (discussed above), regardless of the absence or presence of an obvious reason to combine these references. Accordingly, independent claim 1, as amended, is not rendered obvious by the Yoshida publication in view of the Shinbori patent for at least the foregoing reasons.

New Claims

New claim 15 depends from claim 1 and further recites that the control circuit causes the piezoelectric element to vibrate at a frequency corresponding to a resonance frequency of the optical element, to thereby cause flexural standing wave vibration in the optical element. New claim 15 further distinguishes the claimed invention over the cited art. New claim 15 is supported, for example, by Figures 6-11 and their related description and page 29, line 24 to page 32, line 24 of the specification.

New claim 16 depends from claim 15 and further recites that the control circuit changes a frequency at which the piezoelectric element vibrates, to thereby cause at least two flexural standing wave vibrations in the optical element. New claim 16 further distinguishes the claimed invention over the cited art. New claim 16 is supported, for example, by Figures 6-11 and their related description and page 29, line 24 to page 32, line 24 of the specification.

New claim 17 depends from claim 1 and further recites that the flexural standing wave vibration has an amplitude of vibration in a direction perpendicular to an optical element surface of the optical element. New claim 17 further distinguishes the claimed invention over the cited art. New claim 17 is supported, for example, by Figures 6-11 and their related description.

New independent method claim 18 recites a control method for a photographing device provided with a dust removing mechanism which removes dusts from an optical element arranged in a photographing light path, the method comprising generating a first flexural standing wave vibration in the optical element, and generating a second flexural standing wave vibration different from the first flexural standing wave vibration to remove dusts from a position corresponding to a node of the first flexural standing wave vibration. New claim 18 is allowable for similar reasons as discussed above with respect to independent apparatus claim 1.

New claim 19 depends from claim 18 and further recites that the second flexural standing wave vibration is generated in the position corresponding to the node of the first flexural standing wave vibration. New claim 19 is supported by, for example, Figures 6-11 and their related description.

Conclusion

In view of the foregoing remarks, the applicants respectfully submit that the pending claims are in condition for allowance. Accordingly, the applicants request that the Examiner pass this application to issue.


Any arguments made in this request for reconsideration pertain **only** to the specific aspects of the invention **claimed**. Any claim amendments or cancellations, and any arguments, are made **without prejudice to, or disclaimer of**, the applicants' right to seek patent protection of any unclaimed (e.g., narrower, broader, different) subject matter, such as by way of a continuation or divisional patent application for example.

Since the applicants' remarks, amendments, and/or filings with respect to the Examiner's objections and/or rejections are sufficient to overcome these objections and/or rejections, the applicants' silence as to assertions by the Examiner in the Office Action and/or to certain facts or conclusions that may be implied by objections and/or rejections in the Office Action (such as, for example, whether a reference constitutes prior art, whether references have been properly combined or modified, whether dependent claims are separately patentable, etc.) is not a concession by the applicants that such assertions and/or implications are accurate, and that all requirements for an objection and/or a rejection have been met. Thus, the applicants reserve

the right to analyze and dispute any such assertions and implications in the future.

Respectfully submitted,

June 28, 2011

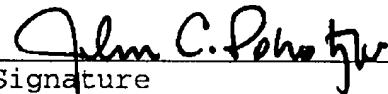

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